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CHILDREN'S HOSPITAL

OF THE DISTRICT OF COLUMBIA

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Clinical Proceedings

CHILDREN'S HOSPITAL WASHINGTON, D.C.

VOLUME XVII • SEPTEMBER 1961 • NUMBER 9

Children's Surgery and Children's Hospitals*

WILLIS J. POTTS, M.D.**

During the past 25 years pediatric surgery has outgrown its high chair and is now seated at the table with the other specialties of medicine. The pallor and lassitude observed from time to time are not caused by a basic deficiency in protoplasm but are due entirely to inadequate diet. This child, pediatric surgery, the latest addition to an already large family of specialties, is not a stepchild but has been born of the lawfully wedded parents, need and demand, and has been nourished on the problem of recognition of the fact that the surgical ills of children are deserving of the same expert care available to adults.

No person or group, even though they may want to, can fashion a specialty in any branch of medicine. Those who try usually practice outside the pale of honest medicine. A specialty is not fashioned; it grows in response to need. We now have had the specialty of pediatrics for so many years that nobody questions the fact that pediatricians care for the ills of infants and children. This was not always true. I can remember about 30 years ago when the generalist, after delivering a baby, acutely resented having parents demand a child specialist. Many men, in order to keep their patients, used to offer six months of infant care thrown in with the charge for delivery. This was not such a bad idea at that because they would urge the mother to nurse the baby and thus avoid the task of writing out a formula. The majority of infants got along fine. Those who didn't were responsible for the development of pediatrics. Nearly 90 per cent of women deliver their infants without any trouble whatsoever; all the obstetrician needs to do is say "hello baby" and tie the cord. For better care of 5 to 10 per cent of more or less abnormal deliveries the specialty of obstetrics grew and thrives. The surgical ills of children—especially newborn infants—are just as deserving of specialized care. As a matter of fact,

* The Joseph S. Wall Memorial Lecture, presented as part of the Postgraduate Course in Pediatrics and Alumni Day at Children's Hospital, May 26, 1961.

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the percentage of difficult surgical problems during infancy is, I believe, comparatively higher than in any other surgical specialty. I hasten to add that the interested family doctor often did and still does a creditable job of delivering babies and is capable of giving them proper care during infancy and childhood. Likewise, there are many general surgeons who, because of constant study and devoted attention, are today handling well the surgical problems of infants and children.

Only during the past two decades have we learned that the serious deformities of newborn infants often can be remedied by properly timed and well executed surgical maneuvers. Death of an infant with or without benefit of surgery for some congenital anomaly was often excused by the remark, "It was only a baby." I will grant that the 4 year old child with dancing eyes and bewitching smile has a stronger hold on the heartstrings of parent and physician than the shriveled-up unresponsive newborn infant who can do nothing but cry. The child is here; he is somebody's baby and, although totally incapable of demanding his rights, is entitled not only to life but to such expert care that later life will be a pleasure instead of a burden. I shall not discuss the advisability of maintaining life in an infant whose deformities cannot be corrected and will be a source of suffering and unhappiness throughout life.

The physiology, pathology, and psychology of the infant, as well as principles of surgical technique and preoperative and postoperative care, vary tremendously from that of the adult. A child is by no means only a small adult. An infant's respiration is fast and often irregular. His pulse is rapid, his temperature labile. A newborn infant requires no fluid the first day of life but by the end of a week 60 cc. per pound (about 120 cc. per kilogram) of body weight each day. In cases of severe dehydration he may require twice that amount. Give an infant what he needs in the way of fluid, electrolytes, sugar and blood, and what that infant will tolerate is constantly a matter of wonder and surprise. A day-old child will tolerate a prolonged operation far better than a 60 year old adult. His cells are young, and he is unhampered by fear; he fights to live. Yet the margin between good health and death is narrow. The child may appear to be on the road to recovery one hour and the next hour be dead.

Even the surgeon must know something about the caloric requirements of an infant and when such a patient should be fed after operation. A newborn infant will survive nobly without food for a number of days, but by about the tenth day, in spite of parenterally administered fluid, sugar, protein, and blood, he will suddenly fade away to the point of no return. Hunger is expressed in more ways than by a cry. When a baby begins sucking his fist after operation food may be started carefully. The average infant smiles at about 6 weeks—the first and all-important mark of dif-

ferentiation between man and animal. When a baby above 6 weeks of age smiles following an operation he is ready for a full tray. The adult patient may loathe food and yet smile bravely because her surgeon looks so attractive in his white coat.

Much has been learned about the surgical care of infants and children during the past 20 years. So much, in fact, that it is necessary even for the man who devotes all his time to pediatric surgery to run in order to keep abreast of new knowledge and techniques.

What sort of a person is this newcomer, the pediatric surgeon who is to apply all this knowledge, and how does he become worthy of the title? Before the last war a few general surgeons, because of deep interest in the subject, had become recognized pediatric surgeons. Today, training facilities, still grossly inadequate, are available for training men in pediatric surgery, and to these men the children's hospitals must look for the development of their specialty. It is no longer possible to accomplish this objective by the hit and miss methods of a generation ago.

A few requirements of a children's surgeon may be mentioned. Basic training in general surgery is an absolute essential. Sound knowledge of the principles of general surgical care must precede training in every surgical specialty. I believe that trainees should have a minimum of three years of general surgical training before being eligible for training in pediatric surgery. There still is no agreement about the desired length of time of specialized training. At our hospital after the war, we started with six months service but soon increased it to one year. About five years ago the training period was extended to 18 months, and I doubt whether it should go beyond that. I belong to that school which believes that a man should be out of his white suit before he has his first coronary thrombosis. Our arrangement up to the time I chose to resign as Surgeon-in-Chief last October was this: A new surgical resident from anywhere in the country—not just from one medical school—was appointed every six months and chosen on the basis of past work, interest, and the ability to get along with his confreres. We have then a junior, middler and senior. Such overlapping provides continuity of service. Recently a fourth man who has had a minimum of training following his internship is appointed for one year as a junior resident.

Natural aptitudes are essential ingredients in the makeup of a pediatric surgeon. If a man does not like children he is in the wrong field. He must be able to tolerate their eccentricities and smilingly overlook their illogical obstruction to all procedures associated with any illness. He must understand the sick child's antipathy to needles, drugs, tubes, and, in fact, to everything that hurts. According to adult standards, children are unreasonable but never willfully vicious. It requires time, patience, and unfeigned

interest to obtain their cooperation. A pediatric surgeon, just as a pediatrician, must learn to think as a child and be sympathetic with, rather than disdainful of, failure of cooperation. It required years for me to learn that a child has unusual instinctive ability to detect antagonism without a word being spoken. Children are such amazing little creatures: Show that you are interested in them as persons, take time to demonstrate that you have their welfare at heart, be scrupulously honest in explaining when a procedure is going to be unpleasant or painful and you not only will not meet with resentment but will have a host of loyal friends. Children have no personal antipathies. Love them and they will love you.

The pediatric surgeon must devote much time to the study of symptoms, especially in infants and little children who do not talk and cannot point to the sore place. He must be able to make diagnoses and handle preoperative and postoperative care. Some ingrained humility is desirable. If not naturally present it will be learned the hard way after making the mistake of not asking for consultation in the puzzling case.

Imagination, guided along constructive pathways and free from the bizarre, is a priceless quality difficult to find in any field of executive capacity. This carefully nurtured imagination will manifest itself primarily in the field of research and teaching. New ideas and modification of existing ideas are the growth factor in any institution. Along with imagination goes the fire which stimulates the members of any department to think, explore and try. Some success in this field soon rouses the interest of people with funds to help support the development program. People like to invest their money in a going concern which is paying dividends. A modest dividend on a small project easily leads to further investment by the public spirited citizen in more extensive undertakings. Money is no problem when it pertains to the care of children. It is men who are needed.

Two objectives are sought in the training of pediatric surgeons: The first is to expose the trainee to sufficient children's surgery so that he can go into a community as a general surgeon and, in a fairly competent manner, take care of unusual surgical problems of infants, particularly the congenital deformities. The general surgeons in town continue to do the routine operations common to children. The second objective is to train men so extensively in children's surgery that they are equipped to enter directly into specialized practice. Eventually a number of these men will head departments of pediatric surgery in children's hospitals.

At this time both objectives are desirable. Until more children's hospitals are available and more pediatric surgeons have been trained it will be desirable to furnish improved surgical care for children by giving men six month periods of training. The second objective, I believe, should be emphasized. Medical students are becoming conscious of pediatric surgery

as a specialty, and it is amazing how many wish to enter the field. For years we have had a minimum of 25 applications for each appointment it was possible to make. This fact does not reflect the superiority of the institution but the growing interest in children's surgery.

In a well established, recognized children's hospital, free from the dominance of a medical school, the training program for surgical residents will have to be geared to existing conditions. Probably a six month period on the children's surgical service as part of a four year general surgical training program has some virtue in that a large number of men are at least exposed to some of the principles of the surgical care of a child. In addition to this rotation scheme, and as soon as the service is large enough to provide adequate material, one or two men who have completed their general surgical training should spend a minimum of a year in children's surgery. Applicants for these positions from any well recognized institution should be chosen on a competitive basis, and from those with the expressed desire to make pediatric surgery their specialty. We must train men to fill the positions which are going to open as more and more universities recognize the need for departments of pediatric surgery.

In discussing the role of the pediatric surgeon and the division of surgery a few years ago, I made a few comments which I wish to repeat. Our most perplexing problem is to decide what constitutes children's surgery and how the work should be divided. The question will not be answered for many years because pre-existing specialties lay claim to certain sections of the body, and will not and should not give them up. A pediatric surgeon cannot adequately cover the entire field of surgery in children without spending most of his life in specialized training. Neurosurgery is obviously a specialized branch of pediatric surgery demanding specially trained men. Orthopedic surgery in children in the United States is largely a separate field, although fractures are still often divided between orthopedics and general surgery. Plastic surgery in most children's hospitals has become a separate division, although general surgeons still rightly do a fair amount of skin grafts for burns. Children's genitourinary surgery is at present a problem child. Congenital anomalies of the genitourinary tract are so common that in another 25 years it is safe to predict that many children's hospitals will have men who devote all their time to urology in children.

The field of chest surgery is the most controversial. Because the heart and esophagus are in the chest, diseases of these structures are claimed by thoracic surgeons. Opening a patient's chest today is as safe as opening an abdomen, provided good anesthesia is available. The chest surgeon who is a recognized expert at lung resection and at the surgical treatment of cancer is not by virtue of these skills capable of handling atresia of the esophagus with tracheoesophageal fistula. The operation for this deformity

requires the finest and gentlest technique—but this is only a fraction of the care. Keeping these infants alive after operation is a task requiring constant attendance and supervised, trained skill. Cameron Haight, a superb chest surgeon, was the first to repair successfully one of these lesions and has continued to be a leader in the handling of this difficult deformity. It would be ridiculous for Dr. Haight suddenly to turn over all these cases to a newly appointed pediatric surgeon.

In every medical center the matter of who does what will vary according to the individual's special interest. However, when surgeons are starting from scratch, so to speak, I believe that all congenital lesions of the esophagus and lungs, such as cysts, empyema, and pneumothoraces, all cases of bronchiectasis requiring lobectomy, and all congenital diaphragmatic hernias should be treated by the pediatric surgeon.

What about congenital heart lesions? There is no reason why the pediatric surgeon, provided he has had training in the treatment of congenital heart disease, should not do such simple operations as closure of a patent ductus, a shunt operation, or resection of a coarctation of the aorta. No one, of course, should attempt any of these operations without training on animals and supervised clinical experience. The handling and dissection of large vessels is a skill which is not mastered by either general or thoracic surgeons without long practice on dogs. The technique of heart and blood vessel surgery can be learned and performed equally well by any surgeon who has availed himself of laboratory and clinical study. Complicated heart operations are a matter of concentrated team work and laboratory work. They will be done by general, pediatric, or thoracic surgeons—it makes little difference which—provided the surgeons have put in many, many hours of basic work.

It will long be impossible to designate just what surgery should rightly fall to the pediatric surgeon. The history of the hospital, local customs, and personality traits—such as eagerness, ambition, and even selfishness—will determine who is going to do what. I suppose we should not be dictatorial about who does what so long as the operator and anesthetist are competent and aware of the tremendous responsibility undertaken whenever a child is put to sleep and subjected to an operative procedure.

People are biased, but is it quite fair for a surgeon who would not think of operating on a brain tumor or repairing a cleft palate to repair atresia of the rectum in a male infant with a rectovesical fistula when he never has seen such a case nor witnessed the operative repair? I pick for comparison the case of atresia of the rectum because such cases, especially those complicated with fistulas to the genitourinary tract, are apt to be poorly handled. If the defects are not properly corrected at the first operation, these patients may be forever incontinent or doomed to a permanent

colostomy. No man is capable of omnisciently deciding who shall do what—the house in which each of us lives is too fragile. Every surgeon will have to decide what he should or should not do according to the dictates of his own conscience. We in pediatric surgery represent a new specialty and should not be asked to solve the problem of division of surgery when the long-established specialties are still battling over their prescribed domains.

I remember some years ago in a large general hospital a gynecologist did occasional hemorrhoidectomies on his women patients. The general surgeons raised their eyebrows and made acrid comments in the corridor. The gynecologist justified the operation because it was performed in territory immediately adjacent to his rightful field of activity. However, when a general surgeon did a simple hysterectomy for a fibroid, howls of protest by the gynecologists echoed down the halls. So long as this is a competitive world—and it would be very dull otherwise—every ambitious surgeon will pass poorly lighted markers and wander as far as he dares into fields that look green and inviting.

It has long been a custom to have in each recognized children's hospital a pediatrician-in-chief. Some are on a full-time basis; all spend the major portion of their time in the hospital. In every well established children's hospital there should likewise be a surgeon who devotes all his time to pediatric surgery. On the following statements there will be much legitimate difference of opinion. This is just one opinion. During this developmental period, I believe the pediatric surgeon should be on a geographical full-time basis. His office should be in the hospital. He should be paid some sort of a salary and have the privilege of making a certain amount of money from private practice. All money above a specified figure should revert to the hospital or university to be used according to the policy of the institution.

The advantages of having the surgeon-in-chief in the hospital full-time are great: He is available to direct and supervise all emergencies; to check constantly on details of postoperative care; to come to the operating room on a moment's notice to confer with his regular or resident staff about some surgical procedure or unusual anomaly; to discuss with the surgical residents innumerable matters about hospital procedures; and to help residents and sometimes members of the surgical staff with the writing of papers for publication and preparation of case reports for hospital presentation.

Another great advantage of having the surgeon-in-chief on a full-time basis is the simple fact that he is a human being with a normally acquisitive nature. The fact that his salary is fixed makes him gracious—he actually appears magnanimous—in referring private patients to the younger surgeons on his staff. As surgery grows in the hospital, the younger men, on a private-fee-for-service basis, will be more apt to make themselves available—will spend much more time in the hospital—and consequently will

grow in surgical stature. It can happen—in fact, I have seen it happen—that one of the younger men makes more money than the chief. So what! That great leveler of all incomes—the Internal Revenue Service—helps solve that problem.

Pediatric surgery has become a recognized specialty of medicine. Although it has grown like Topsy, it has turned out to be an acceptable member who now eats with a fork, has learned how to use a napkin and engage in proper table conversation.

Washington, D. C., is the most beautiful city in America. You have a fine children's hospital which can be equally outstanding and is on the way to that desired goal. Much effort will be required to fill in gaps. Money is not the primary object. Give the general public a sound program and money will be forthcoming without strain. Recognition is gained by application of an old and well recognized formula. Devotion, cooperative planning, submergence of personal interest, broadminded vision, love of children, and compassion for their misfortunes—these are the life of a children's hospital.

Asian Influenza in Children

LORETTA K. GILMORE, M.D.*

Pandemic Asian influenza began in the Kweichow province of Southwest China in February 1957. Within a 6 month period virtually every major country in the world was affected. Because this was a new strain of influenza A virus, the entire population was potentially susceptible: in the United States the estimated clinical attack rate was 25 per cent. Although the clinical attack rate was 23 per cent in one study of 60 families, serological studies indicated that 47 per cent of the population had been infected during the epidemic.[1] In Melbourne, Australia, in 1957,[2] 42 per cent of the population acquired antibody to the Asian influenza virus. Despite the equal distribution of acquired antibody among the various age groups, symptomatic illness was more frequent in young persons than in older persons. The highest incidence of illness occurred in school children, with preschool children less affected, and adults affected least of all.[3-6] In a given community, the first illness usually occurred in high school children, followed by children in the elementary school population. The purpose of

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this paper is to present the clinical features observed in children affected by the Asian influenza virus and to discuss the complications which occurred.

SYMPTOMS

Since the average incubation period for influenza is 2.1 days,[7] an entire school population may be exposed in a few days and an epidemic stage may be reached rapidly. The following observations of the disease were made in five studies,[1, 2, 8-10] two of which were made in school situations requiring residence in dormitories or their equivalent and one at a boy scout jamboree. The findings are based on observations of Asian influenzal illness in 1000 children from birth to 19 years of age. The figures given in table 1 are an approximate average for the combined groups. Not all of the symptoms were mentioned in each study, and, in one report, precise percentages were not given.

The physical findings listed in table 2 are a composite of those observed in 925 children.[1, 8-10]

COMPLICATIONS

The combined complication rate in three study groups was approximately 10 per cent. The most common complications were pneumonia, otitis media, and tonsillitis. One study noted the increased incidence of acute asthmatic attacks in children previously known to suffer from bronchial asthma.[8]

In a fourth group of 70 children, a vaccination program had been completed several days prior to the onset of the epidemic.[9] Another group of 149 boys was treated routinely with sulfonamides and bed rest. There were no complications in either of these groups.

In general, the illness during the 1957 epidemic was no more severe

TABLE 1

Symptoms of Asian Influenza

Major Symptoms	%	Less Common Symptoms	%	Minor Symptoms	%
Fever	96	Chills	40*	Hoarseness	15
Cough	75	Malaise	25	Delirium	10
Headache	70*	Vomiting	25	Nosebleeds	10†
Anorexia	70	Muscle or chest pain	20	Faintness	10
Sore throat	60*	Abdominal pain	20	Eye irritation	10
Nasal symptoms	55				
Sudden onset	55				

Symptoms occurring in less than 10%: diarrhea, dysphagia and earache.

* Low in infants.

† Higher in infants.

TABLE 2

Findings on Physical Examination

Symptoms	%
Fever (average 102.1° F.)	97*
Pharyngitis	70†
Conjunctivitis	45
Rhinitis	35
Lymphoid hyperplasia (pharyngeal)	30
Cervical adenitis	25
Abnormal chest findings	15‡

* In one study, [10] a diphasic fever curve over a 4 day period was observed in 59 per cent of patients. The authors also noted that in relation to height of fever, pulse rates were lower than expected.

† Only one report of less than 60 per cent.

‡ Wide range of values.

In one study, petechiae on the soft and hard palate were occasionally found.

than that experienced during other smaller epidemics due to other strains of influenza in recent years. Complications were highest in young children and elderly persons. One study found a 22 per cent rate of complications in children under 5 years of age as compared with an average of 13 per cent for all ages.

Pneumonia

Pneumonia was the most frequent complication of Asian influenza noted in the United States[12] and pulmonary complications occurred in 5 per cent of cases in Britain.[13] From October 1957 to February 1958, there were 17,000 influenza and pneumonia deaths in excess of the expected rate in the United States,[14] where the largest proportion of pneumonic infections was due to the pneumococcus.[12] Although *Staphylococcus aureus* was found in only 10 per cent of pneumonia cases, the majority of deaths was in the small staphylococcal group. In three reports,[15-17] influenza virus pneumonia unassociated with detectable bacterial infection was responsible for from 25 to 50 per cent of deaths.

The clinical features of the pneumonia were essentially the same regardless of whether or not secondary bacterial infection had occurred.[15, 17-19] The day of illness on which the pneumonia began ranged from two days to over one week. The bacterial pneumonias had a slightly later onset and a longer course when ending fatally.[15]

The clinical findings in patients with pneumonia were fairly uniform in all reports.[15, 17-19] The typical findings were cough, high temperature (usually over 104° F.), dyspnea, hemoptysis, pleuritic chest pain, tachy-

cardia, tachypnea and cyanosis. In fatal cases, rapid worsening occurred, with intense cyanosis, frothy hemoptysis, signs suggesting pulmonary edema, and shock. Poor prognosis was indicated by the expectoration of frank blood and by the occurrence of leukopenia.[19] The death rate in pneumonia patients was 11 and 12 per cent, respectively, in two different series.[17, 19]

Chest auscultation revealed coarse and medium rales and often signs of consolidation. Pulmonary abscesses and pleural effusion were occasionally found. Death appeared to be due to asphyxia. Chest x-rays showed mottled densities and pulmonary consolidation with perihilar congestion. Bronchopneumonia was seen more often in children, while lobar pneumonia was observed more frequently in adults.

Postmortem examination revealed grossly bulky, noncrepitant, hemorrhagic lungs.[20] Microscopically, there was marked hemorrhage, edema, and necrosis of alveolae. Microabscesses of the lung were occasionally found. Interstitial pneumonitis was a common finding in pure influenzal infections.[15] Necrotizing tracheobronchitis was a typical feature, and frequently a hyaline membrane was found lining the tracheobronchial tree.

Pneumothorax

In two fatal cases, pneumothorax was present.[21] Both patients (aged 17 and 23 years) had bronchopneumonia, one with secondary staphylococcal infection and pneumatocele formation. The pneumothorax was felt to be due to ruptured alveolae, bronchioles, or bronchi with spread of air along the perivascular tissue planes of the lungs to the mediastinum, and from there to the pleural space. A 16 year old boy, with almost complete obstruction of the trachea and bronchi by membranous mucosal sloughs, developed mediastinal and subcutaneous emphysema.[22] Extensive pulmonary consolidation was also present in this fatal case.

Laryngotracheobronchitis

In one large study,[22] laryngotracheitis was found more frequently in persons under 30 years of age, while bronchitis and bronchiolitis were more often seen in the older age group. The clinical spectrum of laryngotracheitis was characterized by hoarseness, retrosternal pain, and cough, which was sometimes productive of blood-stained tenacious sputum. In about one half the group, there was evidence of obstruction with paroxysms of cough, breathlessness and cyanosis. In two postmortem examinations, edematous obstruction of the larynx was present.[17]

Tracheotomy in 3 cases was felt to be life-saving.[23] Two of these were children, aged 9 and 11 years. One child was found to have subglottal edema and a large amount of blood-stained frothy fluid in the trachea.

The other, who had reddened, nonedematous vocal cords, was found to have a great deal of hard to rubbery blood-stained material in the trachea. This was identified as a conglomeration of mucous plugs from the bronchi mixed with necrotic cells.

In one study,[11] bronchitis and pneumonia occurred with equal frequency as a complication of influenza in children.

Myocarditis

According to Walsh et al.,[24] Burnett found an 11 per cent incidence of postinfluenzal cardiac disorders. These usually consisted of disturbances in conduction and T-wave changes in the electrocardiogram; only a minority of these patients experienced symptoms. Twenty-three of thirty patients with Asian influenza showed temporary T-wave changes in the precordial leads, but no conduction defects. Sixteen of twenty patients had distortions of the spatial vector cardiograms suggesting mild injury and hypertrophy or dilatation of the right ventricle. These authors noted that bradycardia occurred during the acute, febrile stage of influenza in 66.7 per cent of patients.

In a study of Asian influenza in 50 patients from birth to 19 years of age,[25] one new case of cardiac disease was diagnosed. In another series of 50 infants with pulmonary complications of Asian influenza,[26] six developed heart failure. In contrast to adults, there was no bradycardia or arrythmia in these infants, and all recovered completely.

In a review of 33 deaths due to influenza occurring during the 1957 epidemic, myocarditis was found at postmortem examination in 3 cases.[20] A virus-positive myocardium showed vascular lesions manifested by fibrinoid degeneration of arteriolar walls and focal fibrin thrombi. Examination of the heart of a 15 year old boy who died of Asian influenza showed necrosis of the muscle fibers and an infiltrate of mononuclear cells, lymphocytes, a few plasma cells, and occasional neutrophils.[15] Myocarditis had not been suspected antemortem.

Central Nervous System Involvement

The incidence of central nervous system disorders in Asian influenza probably occurred in approximately 1 in 9,000 cases in one large survey.[6] Included in this category were cases of encephalitis, meningitis and psychosis. Clinical manifestations included nuchal rigidity, convulsions, delirium, coma, cranial nerve weakness, transient paralysis of limbs, ascending paralysis, and ataxia.[19, 20, 25, 27-29] In three children, aged 9 to 15 years, psychosis manifested by anxiety, restlessness, confusion, and ideas of persecution occurred within a few days after the onset of Asian influenza.[30] The acute psychotic symptoms receded within a period of six to eight days, leaving the patients with amnesia for what had occurred. Most

symptoms of a central nervous system disturbance appeared within a week after the onset of influenzal disease (range: 2 to 30 days). Cerebrospinal fluid was reported as normal in most cases, but in one study[27] there were findings compatible with aseptic meningitis. Symptoms lasted for about one week, and recovery was generally complete. Electroencephalograms were found to be abnormal in 75 per cent of nonfatal cases of encephalitis[29] and in all 3 cases of psychosis.

In a series of 36 cases of meningo-encephalitis, there was a death rate of 11 per cent.[27] Postmortem brain examinations showed a wide range of pathology. Several examinations were reported as negative.[19, 31] Others revealed congestion, swelling, flattening of gyri, or inflamed leptomeninges.[20, 27, 29] Demyelinization and perivascular cuffing were minimal or absent.

One interesting report[32] describes several cases of neurological and hepatic disorders associated with type A influenza (strain studies incomplete) during the 1957 epidemic. The patients ranged in age from 14 to 26 years except for one child, aged 2 years 9 months. There was an afebrile interval of from one to seven days after the initial influenza attack. Subsequently, fever, vomiting, and (in 19 cases) coma occurred. In 15 patients there were localized neurological signs pointing to involvement of the pyramidal tract, or resulting in conjugate deviation. One patient developed extensive paralysis and died of respiratory failure. In 17 fatal cases, all patients had clinical or biochemical evidence of jaundice. Pathological examination of the livers in these patients showed evidence of fatty changes and, in most cases, evidence of portal or periportal round cell infiltration. In addition to the expected pulmonary findings at autopsy, all cases showed moderate to severe congestion of the brain, with petechial hemorrhages in the white matter. In a few instances, neuroglial proliferation was present. One brain from which influenza A virus was isolated showed neuronal degeneration.

Eye Involvement

A macular lesion has been observed in one young adult[33] with diminished vision for distant objects after an attack of influenza. This lesion was thought to be of vascular origin, i.e., phlebitis with petechial hemorrhages. The author mentions other ocular complications reported in influenza to be optic neuritis, iridocyclitis, interstitial keratitis, marginal ulcers and dacryoadenitis. Since the eyes are not generally affected, the possibility that other conditions not directly connected with the influenza are the bases of the eye disorder must be considered.

Abdominal Organ Involvement

In addition to the previously mentioned vomiting and occasional diarrhea, abdominal pain is not an uncommon symptom in influenza. In one

case, pain was severe enough to suggest appendicitis;[24] at operation, a normal appendix was found. In one series, petechiae of the stomach were found in 10 of 24 necropsies, and acute gastric erosion in 2 cases.[17] Fatty liver, septic spleen and pale kidneys were also described. There was microscopic evidence of cloudy swelling of the kidneys in six of these cases and bilateral necrosis of the proximal tubules in 3 cases.

MORTALITY AND ANTECEDENT DISEASE

As expected, the age distribution of mortality in the 1957–1958 influenza epidemic indicated that the highest rates occurred in young children and old persons.[12] Another important factor contributing to lethal infection was the presence of chronic illness or pregnancy. In various reports,[17, 19, 20, 31] the frequency of fatal cases in patients in whom antecedent disease was present varied from 35 to 88 per cent. Patients with chronic heart and lung disorders contributed heavily to mortality figures.

The presence of antecedent staphylococcal skin infection in the patient or his contacts was of major importance in determining the appearance of secondary staphylococcal pneumonia. In a series of 40 cases of influenza complicated by staphylococcal pneumonia, 14 patients had the same strain of staphylococcus cultured from preceding skin lesions in themselves or in their contacts.[35] In another 8 cases there was probable correlation. The authors point out the necessity for treating staphylococcus sources vigorously in the presence of influenza. In 477 fatal cases of pneumonia during the 1957 epidemic, in a majority of the patients influenza virus was demonstrated when sought; staphylococci were present in the lung or sputum in 62 per cent.[36]

LABORATORY

In one clinical study of 591 boys ranging in age from 11 to 19 years routine laboratory work was performed in approximately 90 per cent.[8] Ninety-two per cent of the white blood cell counts were less than 11,000 per cu. mm.; 22 per cent were less than 4,500 per cu. mm. Differential counts were normal in 31 per cent, showed a relative lymphocytosis in 36 per cent and a relative neutrophilia in 33 per cent. In another study, erythrocyte sedimentation rates were found to be elevated in 21 of 24 patients.[24] In this group of patients, hepatic function tests and serum glutamic-oxalic-transaminase levels were normal.

It is not within the scope of this article to discuss the intricacies of virus isolation or serological testing except to mention the large number of tissues from which the influenza virus has been isolated. These include lung, spleen, lymph nodes, liver, kidney, heart and brain.[20] It is of interest that in one case of fatal influenza the virus was isolated only from the tonsil.

VACCINATION

At Lowry Air Force Base, Colorado, a large scale vaccination program was undertaken in anticipation of the 1957 Asian influenza epidemic.[37] This was a controlled program involving 2,309 men, half of whom received the strain-specific vaccine. The vaccine consisted of inactivated Asian strain influenza virus which had been prepared in the allantoic fluid of chick embryos. One cubic centimeter of vaccine, containing either 200 C. C. A. (chicken cell agglutinating) units or 400 C. C. A. units, was given subcutaneously. Controls received a similar quantity of either a formalin-saline mixture or an influenza B vaccine. The protection ratio for the 200 C. C. A. unit group was 2.5:1, and for the 400 C. C. A. unit group, 3.6:1. The authors state that because the subjects had had no significant experience with the dominant antigens of the Asian strain, results were not so good as in previous influenza vaccine studies. On the basis of antibody studies, a double or booster type of immunization schedule produced far better antibody response than a single dose.

SUMMARY

During the 1957 Asian influenza epidemic the highest attack rate occurred in school children. Major symptoms included fever, cough, headache, anorexia, sore throat, and nasal congestion. The most frequent physical findings were fever and pharyngitis.

Complications of influenza occurred most frequently in young children and old people. Complications included pneumonia, pneumothorax, laryngotracheobronchitis, myocarditis, otitis media and tonsillitis; additional complications occurred referable to the central nervous system, eye, and abdominal organs. Staphylococci were the most frequent bacterial invaders in fatal cases.

Vaccination in advance of an epidemic has been shown to confer partial protection from influenzal illness.

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Psychosomatic Tic: A Case Report with Discussion

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A tic is usually defined as a habit spasm which may have its origin in an organic cause, but then continues to be used inappropriately. Frequently tics have emotional origin or implications as exemplified in the accompanying case.

CASE REPORT

F. C., a 7 year 10 month old boy was admitted to Children's Hospital in February 1959. His complaints on admission consisted of fever, abdominal pain, visual difficulties, and jerking of the head to one side of one week's duration.

This was a well developed white 7 year old boy who was alert and cooperative but shy. When otherwise unoccupied, he sucked his thumb. Inappropriate blinking and occasional quick, jerking movements of the right arm were present. No unusual movements of the head were noticed. Rectal temperature was 101° F. A small amount of serosanguinous discharge was found in the nose, and occasional rhonchi were heard in both lung fields. Except for phimosis, the remainder of the examination was entirely within normal limits.

Fever, abdominal pain, and signs of respiratory infection subsided within 72 hours without treatment. Inappropriate blinking and jerking movements of the arm persisted. The patient was referred to the Psychiatry Department where the following history was obtained:

F. C. was born in March 1951 in South America. The prenatal period and delivery were considered normal. Birth weight was 7 pounds 8 ounces. Pyloric stenosis was diagnosed, and surgery was performed at the age of 5 weeks. The postoperative course was uneventful, and the infant developed normally. He sat at 6 months and walked at 12 months of age. His general health had been good except for partial intestinal obstruction requiring hospitalization for several days at Children's Hos-

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pital in December 1953 at the age of 2 years 9 months. Treatment had been medical only. The patient recovered, and there have been no recurrences.

Bed wetting had been present "since he was a baby" with a short interval of dryness during a visit to South America in 1955. Toilet training for bowel control was not accomplished until the age of 4 years. Thumb sucking had been present "at all times." When he was age 3 years his mother noticed that he would clench his fists when he was excited or upset. This also showed temporary improvement during the South American visit in 1955. Three years prior to this admission, the patient began having difficulty going to sleep. This became progressively worse, and at the time of this hospitalization, he was staying awake until 2 A. M. His mother would put him to bed at 8 P. M., and stay with him until he went to sleep. Sometimes he had nightmares, often involving a large gorilla.

One year prior to admission, inappropriate eye blinking began. About six months later grimacing of the face and jerking movements of the head were noticed by the teacher in school; these, however, escaped the parents' attention until one to two weeks prior to hospitalization.

In school, he was rated in the upper half of his class, the second grade. He was exceptionally neat in his work but did not show any particular talents. He appeared to be very shy in class and had no friends. At home he loved to play outdoors, but often lacked the opportunity as the family lived in city apartments while in the United States. His conversation often centered around South America and the big yard there where they had lived.

This boy's father is an American who met his wife in South America while working there as an army electrician in 1948; she was native-born. They married two years later in the United States, and during the first few months of their marriage lived with the father's parents. There, family friction and alcoholism added markedly to the strain of the marriage which from the beginning was also complicated by a great deal of sexual difficulty. This difficulty had persisted up to the time of the patient's admission to the hospital.

A girl, two years older than the patient, is the only sibling. She was described as being a very happy child but overweight. Temper tantrums had occurred frequently during her earlier childhood.

The patient was first brought to the United States at the age of 7 months. Two other trips to South America were undertaken by the mother and the two children, one in 1953, and the other in 1955. During each visit to South America a great deal of tension existed between the parents. During his father's absence the boy showed fears that he would never see his father again; this occurred in spite of the mother's assurances that the father would be back again. She even insisted on talking to the children only in English while in South America.

The father was described by his wife as very inconsistent in his behavior toward her and the children. At times he was kind and loving; yet he seemed to become rough and punishing with very little provocation. The mother herself was neat, and very efficient in her household duties. Both parents showed genuine interest in the boy's welfare. However, both felt that their marriage was under so much stress that separation might be the only answer.

During the psychiatric diagnostic interview in the playroom the boy showed restriction of movement. Upon entering the room he proceeded to the shelves lined with toys, but spent some time observing the toys before he touched them. He then examined all the guns and attempted to shoot darts, which he did by holding the gun so close to the floor that the dart could not possibly escape from the barrel. He punched the punching bag once, then dismounted it and swung it like a bat. He

told the interviewer that at home children were not allowed to make noise because they could be put out of the apartment if they did. At school the whole class was getting punished if any of the children made noise.

On examining the fort with soldiers, he said that soldiers fight because they are angry; also, that people who drink usually fight and try to kill other people. He was asked about his insomnia. He answered that he could not go to sleep because he was thinking about so many questions that he wanted to ask his mother. He did not tell the interviewer what these questions were.

During the early part of his childhood the patient had been exposed to his grandfather who was a heavy drinker. At the time of our study, he was exhibiting fear at home each time that his father drank. According to the mother, he had told his sister that he was afraid his father might kill his mother.

From this and other interviews it was concluded that this boy was unusually preoccupied with aggression, and had conflict about the appropriate way of expressing aggression. It was apparent that he had been exposed to violence, and had resultant fear of being hurt by adults. This insecurity and anxiety were important in structuring his symptoms.

On the modified Stanford Binet test he obtained a score of 116. The Rorschach responses were indicative of considerable exposure to adult sexuality. This was denied by the parents.

DISCUSSION

According to Kanner,[1] tics are sudden, quick, involuntary, and frequently repeated movements of circumscribed groups of muscles, serving no apparent purpose. Menninger[2] feels that they represent the expression of certain psychic and physical tensions which are denied a more comfortable release. Some of the examples of types of movement which have been classified as tics are blinking of the eyes, wrinkling of the forehead, grimacing of the face, teeth grinding, head shaking, nodding or banging, sniffing, clearing the throat, swallowing or coughing, ejaculation of words, and jerking of the extremities.

The same patient may show several types of tics. These may occur separately or simultaneously, and one type may precede or follow the other. In children, tics tend to be multiple and are less definitely fixed in their patterns than in adults. The tics may appear at any age. In a study by Boncour, as cited by Kanner,[1] there was an incidence of 15 per cent of tiqueurs between the ages of 2 and 4 years. In Kanner's study the youngest tiqueurs were 6 years old. The first symptom equivalent to a tic, that of fist clenching, appeared in the present case at the age of 3 years.

English and Pearson[3] say that children with tics often show no signs of personality difficulties other than the tic. Kanner,[1] on the other hand, states, "In the study of our cases we did not encounter one single patient who did not offer additional personal difficulties." As additional personal difficulties Kanner cites emotional instability, vomiting, hypochondriacal trends, enuresis, nightmares, easy fatiguability, pylorospasm, colospasm, disobedience and masturbation. Our patient, in addition to clenching his

fists, blinking his eyes, jerking his head and extremities, all of which can be classified as tics, also had insomnia, nightmares, excessive shyness, thumb sucking and enuresis. He also had had corrective surgery for pyloric stenosis.

Various theories have been offered to explain the etiology of tics. Ferenczi,[4] in 1921, suggested that libido connected with genital sensation was transformed into muscle erotism and displaced to other parts of the body, resulting in decreased genital potency and increased pleasure in muscular movement. He also compared tic to catatonia, the tic acting as a localized motor defense in contradistinction to generalized catatonia. Abraham[5] compared tics to compulsive obsessive acts although he found two significant differences between them. The ticqueur does not attach any significance to his tic and does not experience discomfort from omitting it as do the obsessional patients. Abraham further believed that tics, like compulsive acts, possess a hostile component. Levy[6] suggested that tics represented inhibitions of impulses which were regarded by individuals as dangerous or shameful, and usually of sexual or aggressive nature.

Kanner[1] states that tics ". . . afford the child a motor release of accumulated emotional stresses. . . No happy, secure child ever develops tics. There is always a close correlation between the intensity of the movements and the severity of the emotional strain to which the patient is subjected." Friedreich thought that tics were coordinated memory spasms originating from involuntary repetition, with consciousness fully preserved, of a primarily purposeful action. Meige and Feindel tried to explain it in genetic dynamic principles. Explanations have also been offered on the basis of abnormalities of the striate body. These theories originated from observations in postencephalitic patients.[1]

Margaret Gerard,[7] in reviewing papers on psychodynamic factors of tic production, compares the views of Mahler and Levy on the attitudes of the patients' parents. While Levy found the parents to be compulsive and meticulous, Mahler described them as ambitious for intellectual achievement. Wilder and Silberman, as cited by Ritvo,[9] found that tics frequently occurred in children who came from families where there were conflicts between the parents.

In the case presented here, the mother was quite meticulous about cleanliness and orderliness. Both parents were interested in the intellectual achievements of their children. While the mother persistently taught her children two languages, English and Portugese, the father had stated that he wanted to give his children all the schooling he could possibly afford. The home situation was characterized by continuous conflicts between parents.

Mahler and associates,[8] in the study of 33 child tiqueurs found that 79 per cent were boys and 21 per cent were girls, 64 per cent Jewish and 36 per cent non-Jewish. Of 33 cases, 29 patients had an exceptional position in the family setting, such as being the only child or the "baby." Many of the children were overindulged in the oral stage of the emotional relationship. Thumb sucking was only rarely a problem in the Mahler study. In the present case, the patient had been sucking his thumb constantly. His position in the family setting was also exceptional in that he was the younger of two children, and the only boy.

Toilet training difficulties were reported in 3 cases by Mahler and associates, and enuresis in five. Our patient is still enuretic at the age of 7 years 10 months, and he did not attain bowel control until 4 years of age. Motor development in these children showed no gross abnormalities. Our patient developed normally in that respect, and began walking at 12 months of age. Most child tiqueurs showed clumsiness of gross muscular movements at a later stage, accompanied by good coordination in fine movements involving small muscles. Our patient showed no such clumsiness, but there was marked restraint of gross movement.

In the Mahler study there was restriction of free motor development through possessive overprotectiveness and overstimulating infantilization of these children by their mothers and even fathers. There was often evidence present for excessive contact with adults. "Overidentification with the mother was paramount in the aggressive girl tiqueur and in the passive boy tiqueur."

The IQ rating with revised Binet Simon tests in the Mahler study was from 110 to 140 in 18 boys; only three ranged below 100. School achievements did not correspond to the IQ findings. This applies directly to our patient who, although in the upper half of the class, was not outstanding.

Treatment of tics involves not only the patient, but also his environment. Not the tic, which is the symptom, but the underlying problems producing it must be attacked. Mahler and associates[8] recommend therapy with the following objectives in mind: 1) psychotherapy, 2) elimination of pathological environmental influences, and 3) opportunity for the channelization of the increased motor urge.

In general, according to Gerard,[7] the prognosis for child tiqueurs is better than for adults, although even after satisfactory treatment relapses may occur under stress. It has been noted that with clinical improvement and lessening of the tics during therapy, aggressive and muscular activity becomes increased.

Our patient was recommended for psychotherapy. The parents were, in addition, referred for marriage counselling.

SUMMARY

The case of a 7 year old boy tiqueur is presented. Proposed theories of etiology, clinical manifestations and recommended treatment of tics occurring during childhood are discussed.

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The Editor's Column

The Future of the Juvenile Diabetic: A Challenge

Fourteen years ago the statement was made: "One of the most stimulating aspects of the care of the young diabetic is the realization that the patient and doctor are blazing a trail over which but few have trod."[1] Now, 40 years after the discovery of insulin, the number of young diabetics traveling along this path has become fairly numerous, some walking with vigorous step, some faltering, others having fallen by the way. Today the juvenile diabetic population is said to number one per 2,500 individuals,[2] which would indicate that there are well over 50,000 such persons living in the United States. Prior to the use of insulin the usual life expectancy of the juvenile diabetic was between one and three years. Now the duration of life of those who have benefited from the use of insulin and modern

diabetic therapy has increased tenfold.[3] The estimated life span is three fourths of the normal.[2]

Physicians can view this achievement with considerable pride and satisfaction for their part in attempting to adjust a major endocrine and metabolic dysfunction. Any physician who accepts the responsibility for directing the treatment of the newly diagnosed juvenile diabetic must realize that there probably will be many difficult years ahead for patient, family and doctor. The initial recognition of the disease should not be difficult; however, the constant change brought about by growth and development, and the introduction of psychological problems will make necessary frequent changes in the diet and insulin dosage.

The ability of both the physician and the family of the patient to understand and cope with the problems and thinking of the young diabetic is as important as being able to prescribe the necessary diet and insulin. The care of the diabetic child involves the training, the active cooperation and the sharing of responsibilities by at least one parent, and, for a successful outcome the entire family should be involved. Much of the success or failure of the treatment of the young diabetic will be determined by the conditions which prevail in the home. If there is an adequate amount of discipline coupled with love and understanding among the members of the family, the physician can be reasonably assured that his patient will do well. If both parents are employed and the responsibility for the diabetic care is placed in the hands of a person not a member of the family or exclusively with the child, the end result will probably be disaster.

The physical deterioration of, and complications occurring in, the juvenile diabetic during adult life have been recently brought to my attention by the personal review of the case records of 16 diabetic women whose disease had been diagnosed during childhood. These women had undergone 48 pregnancies. Pyelonephritis and/or Kimmelstiel-Wilson disease had affected 40.9 per cent of the 16, and of these, three were blind. These three women have each had two children and have made satisfactory mental adjustments to their disability, but all represent potential charges upon the communities in which they live.

White[4] lists the relative frequency of sequelae in the thirty-year survivors of 478 juvenile diabetics as follows: Retinopathy progressing to blindness in 8 per cent, hypertension progressing to cardiovascular accidents in 4 per cent, and to myocardial infarction in 19 per cent, and calcified arteries progressing to gangrene in 3 per cent. In the thirty-year group, nephropathy was replaced by cardiovascular disease as the chief cause of death.

Opposed to the somber side of the picture is the long-term survival of the juvenile diabetic who has lived in a good family environment, aided by its understanding and intelligent cooperation, and who has been under con-

sistent treatment by one physician. Root[3] states that these long-term survivors "were conspicuous for the strenuous control of their diabetes in early years. Complications of the diabetic type had occurred, but only after long duration of diabetes."

The physician who undertakes the treatment of the young diabetic has to a considerable extent the power and capability to extend the life span of his patient and to enable him to lead a useful and satisfying life. It should also bring to him the appreciation of the hazards which the patient must encounter. The economic and social problems which affect the present-day family makes the successful rearing of such a patient a real challenge to all concerned.

E. Clarence Rice, M.D.

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